Buckthorn Eradication Project

Middlefork Savanna Pilot Project

Matt Ueltzen, Restoration Ecologist
Lake County Forest Preserves

Lake County Forest Preserves
www.LCFPD.org

Buckthorn Eradication Project

Middlefork Savanna Pilot Project

- Why Eradicate Buckthorn?
- Extent of Buckthorn Population/Impact
- Middlefork Savanna Natural Resources
- Buckthorn Eradication Plan
- Plan Phases

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Why Buckthorn Eradication?

LCFPD Strategic Planning (2014-2015)

5-10 Year Goal:

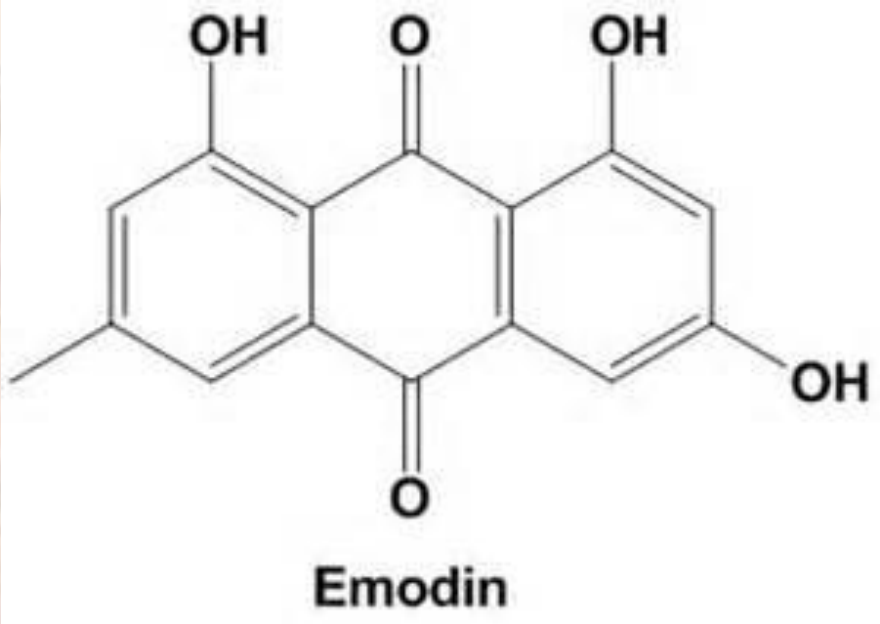
"Eradicate buckthorn on District lands through restoration and management and reduce buckthorn by 50% in Lake County through partnerships and outreach."

Why Buckthorn Eradication?

- Reduce native cover and diversity

Why Buckthorn Eradication?

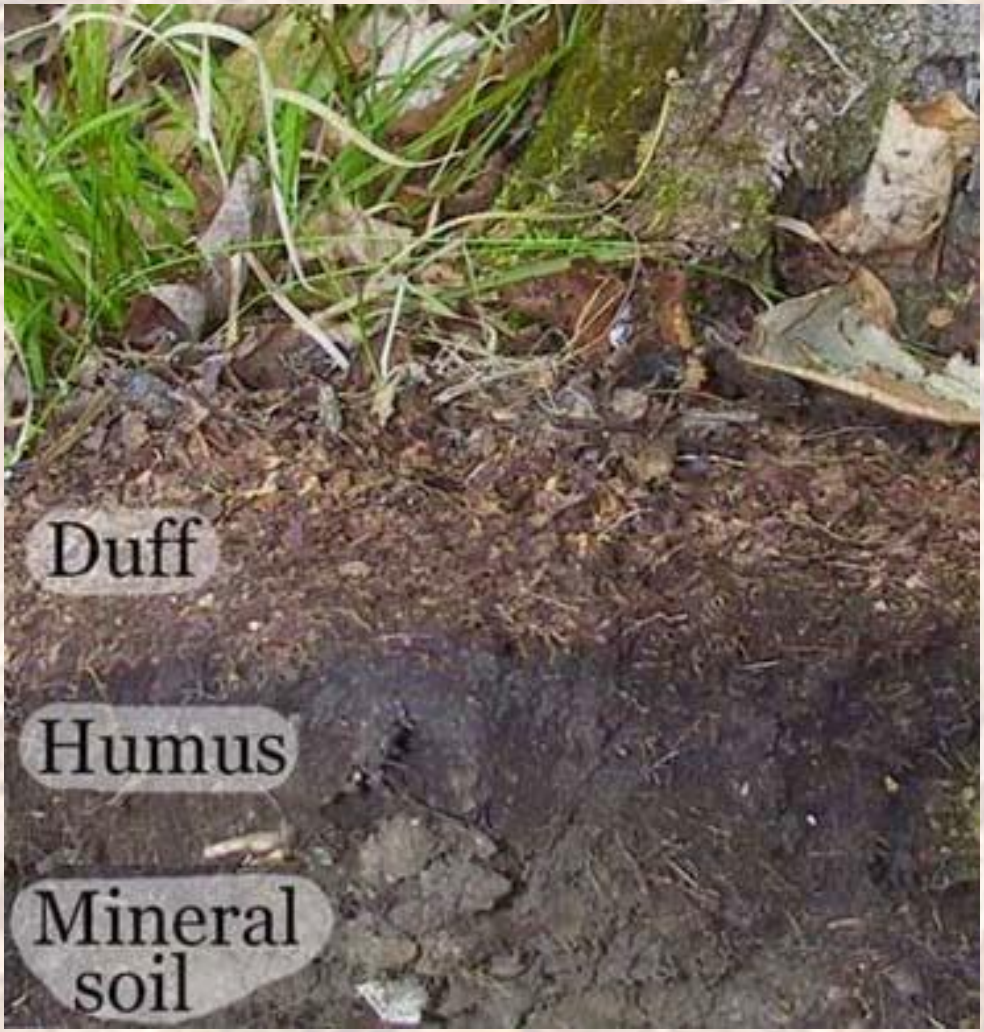
- Produce Emodin
  - Chemical produced by buckthorn
  - May deter herbivory, provide disease resistance, and may have allelopathic effects
  - Wildlife impacts



Why Buckthorn Eradication?

- High Nitrogen Leaf Litter
  - Decomposes rapidly
  - Increases decomposition of all leaf litter
  - Alters natural soil arthropod communities
  - Alters soil pH

Why Buckthorn Eradication?



Why Buckthorn Eradication?

- Impacts to Wildlife
  - Buckthorn is not food source for native wildlife
    - Berries are low in fat – poor food for pre-migration diet
    - Exclude other insects
    - Cause diarrhea
  - Bird diversity decreases as buckthorn invasion increases at a site
  - Birds nesting in exotic shrubs experience a higher level of nest predation

Why Buckthorn Eradication?

- **Impacts to Wildlife**
  - **– Amphibians**

Buckthorn Invasion

High N Leaf Litter

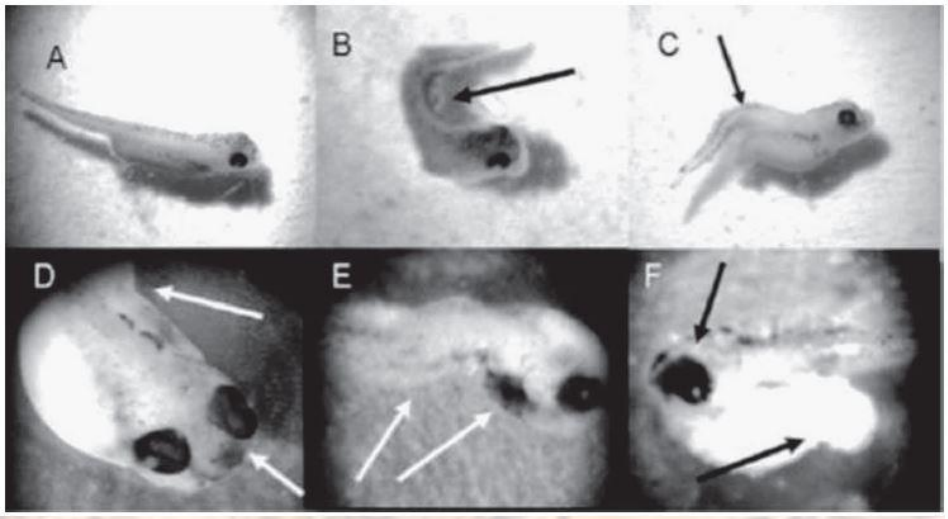
Increased Decomposition

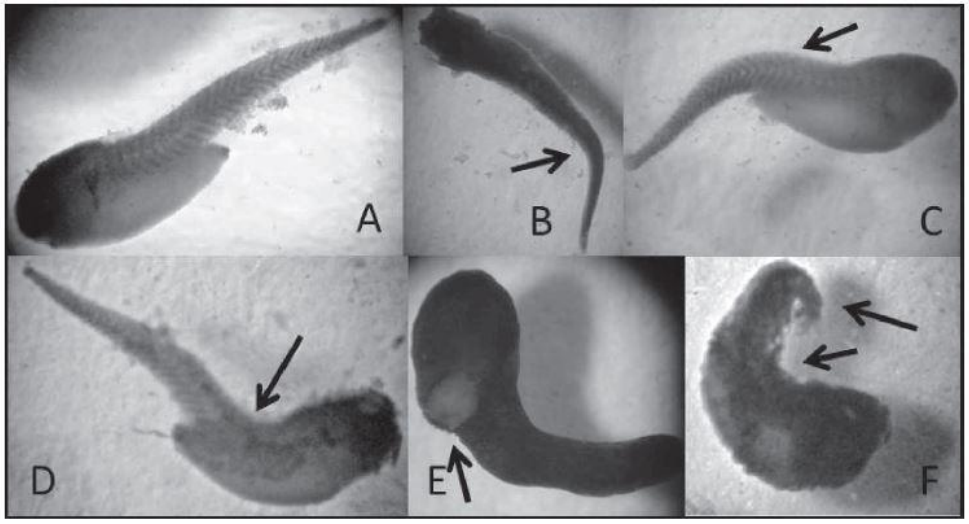
Reduced Dissolved Oxygen

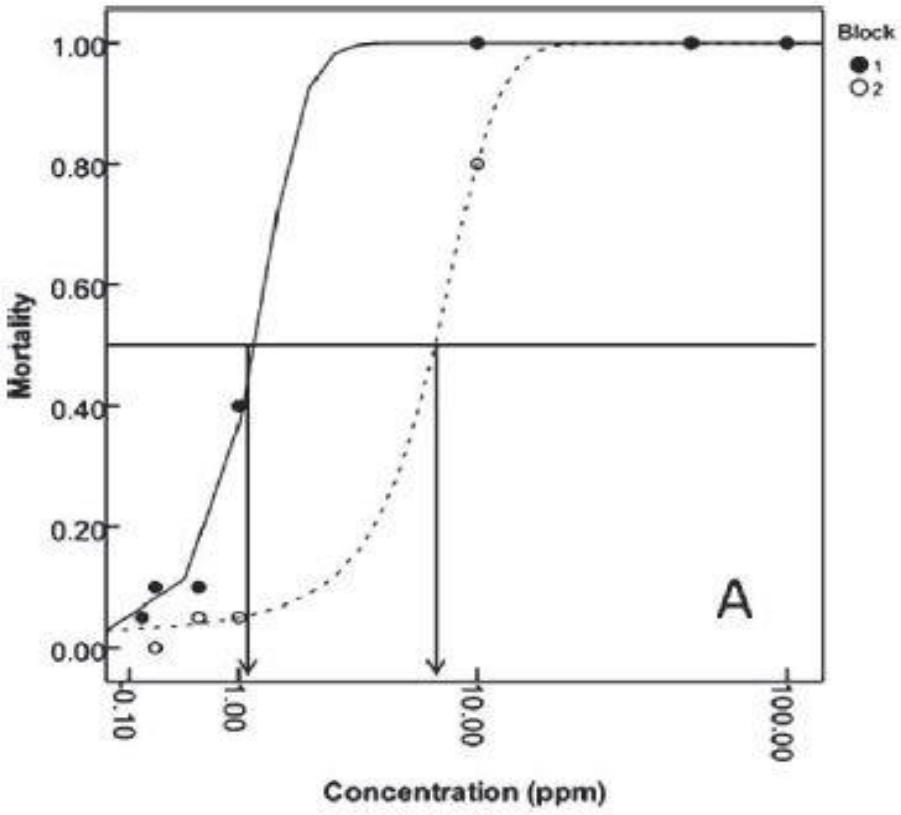
Egg Suffocation Death

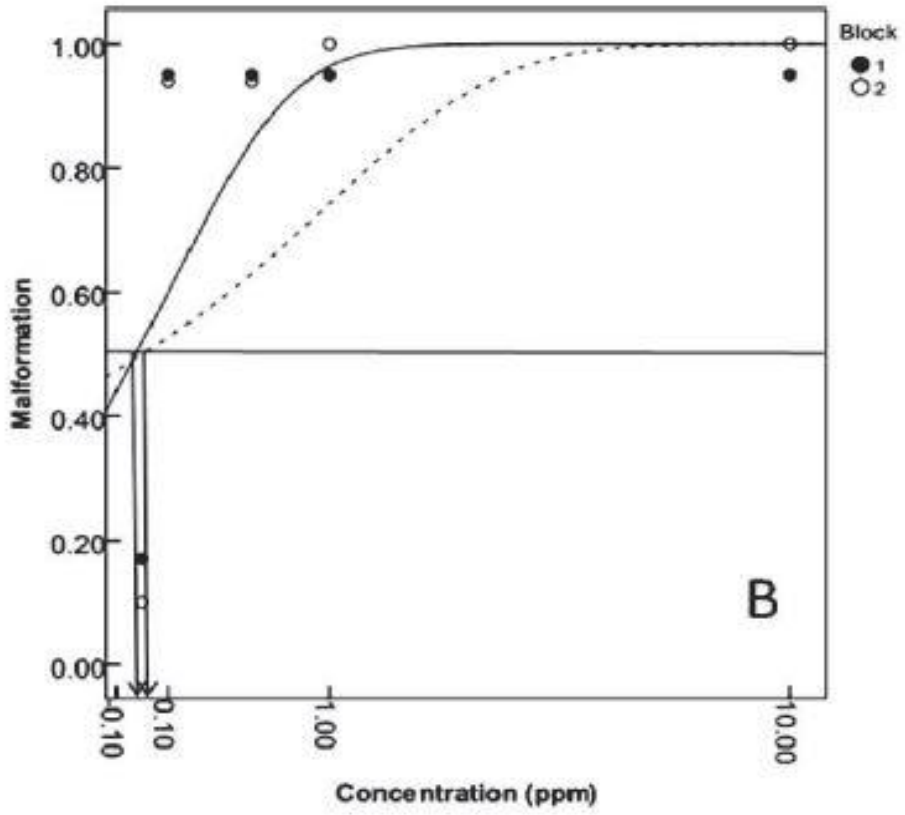
Why Buckthorn Eradication?

- Impacts to Wildlife
  - Amphibians
    - Research into the effects of Emodin on developing embryos: NIU/Lincoln Park Zoo at MacArthur Woods









Sacerdote and King. 2014. Journal of Herpetology

Results:

-Emodin caused 100% mortality at concentrations above 50 ppm

-Caused developmental malformation even at the lowest concentrations tested: 0.1 ppm

-Soil concentrations of 2.0 ppm have been observed in the field

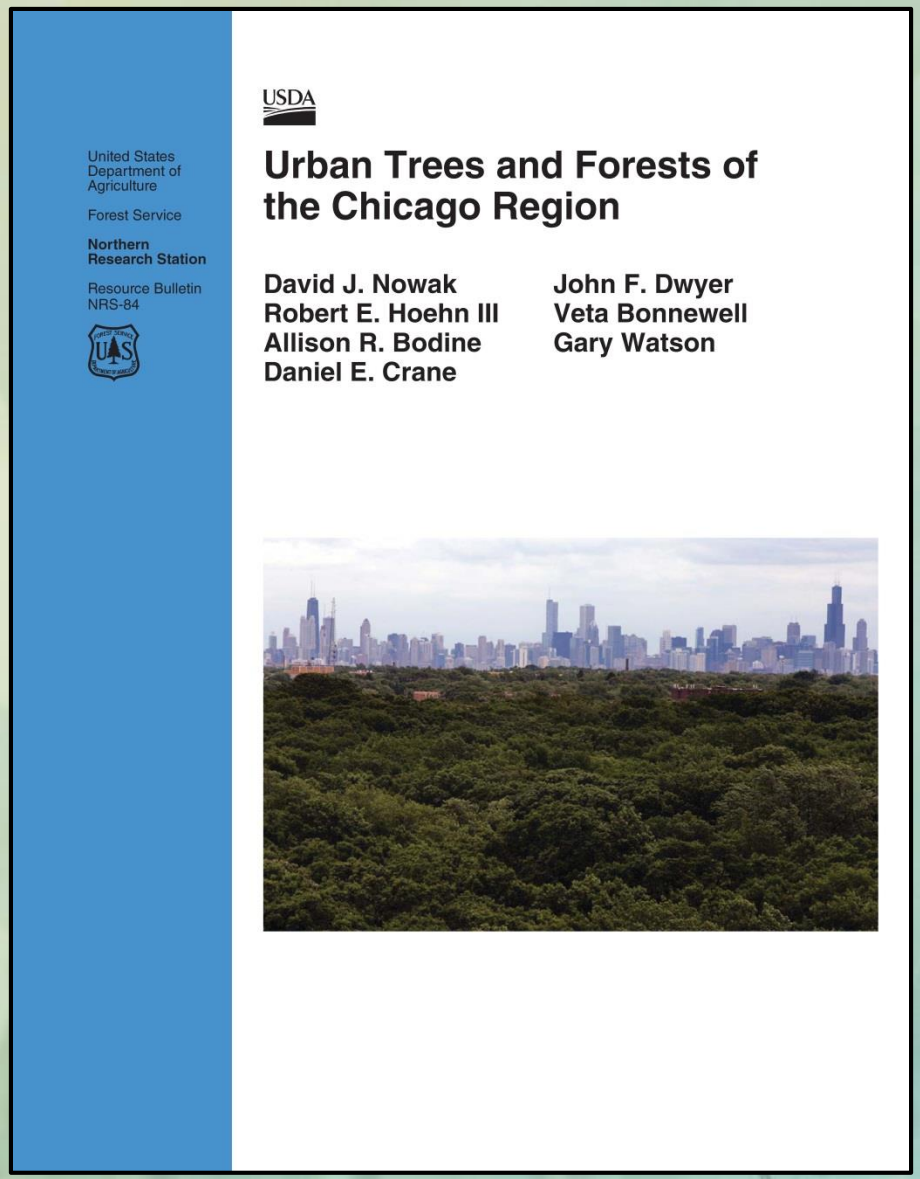
Why Buckthorn Eradication?

- Other Impacts
  - Buckthorn may be host for crop insect pests
    - Potato and Soybean Aphids
  - Fungal Diseases
    - Oat Crown Rust and Other Cereal Rusts

Extent of the Impact

USDA Forest Service: *Urban Trees and Forests of the Chicago Region* (2010)

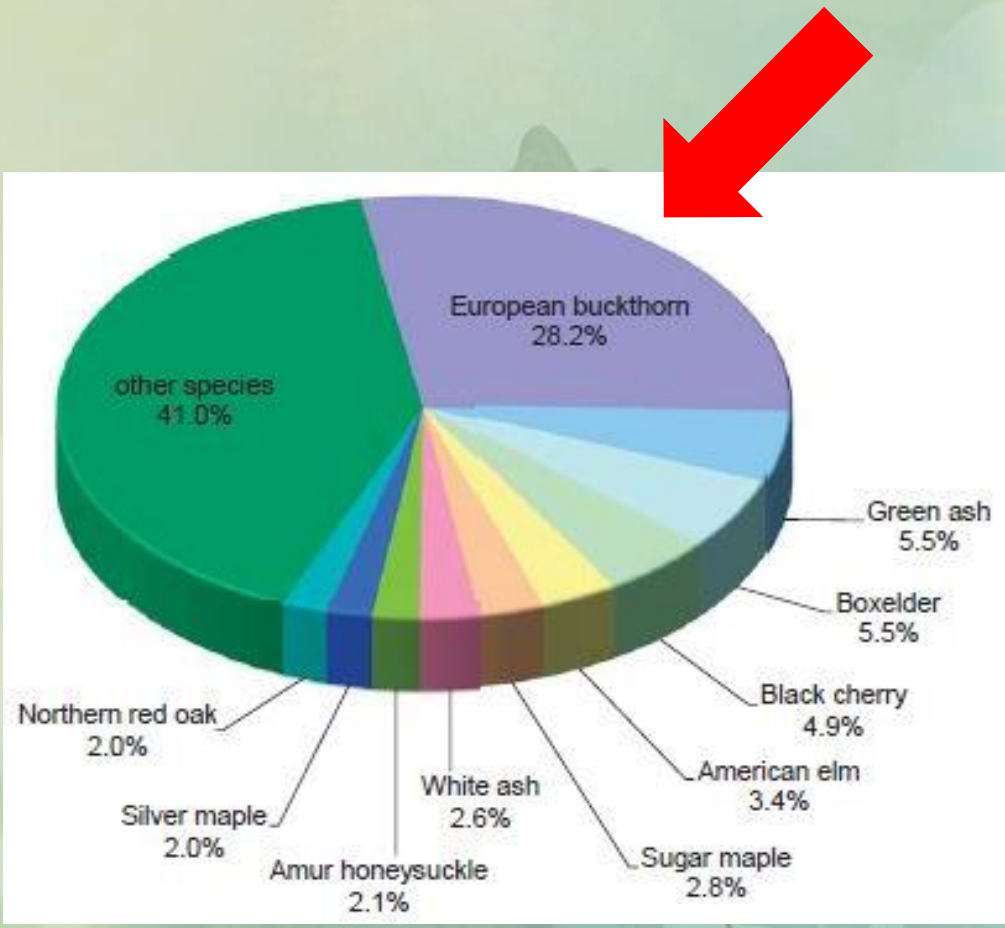
Provides a tree census of the Chicago Region



Extent of the Impact

Buckthorn is the most common tree in the Chicago Region:

28.2% of all trees



Urban Trees and Forests of the Chicago Region (2010)

Extent of the Impact

Unfortunately, Lake County is the most impacted area in the region.

40.9% of all trees in the County are buckthorn!

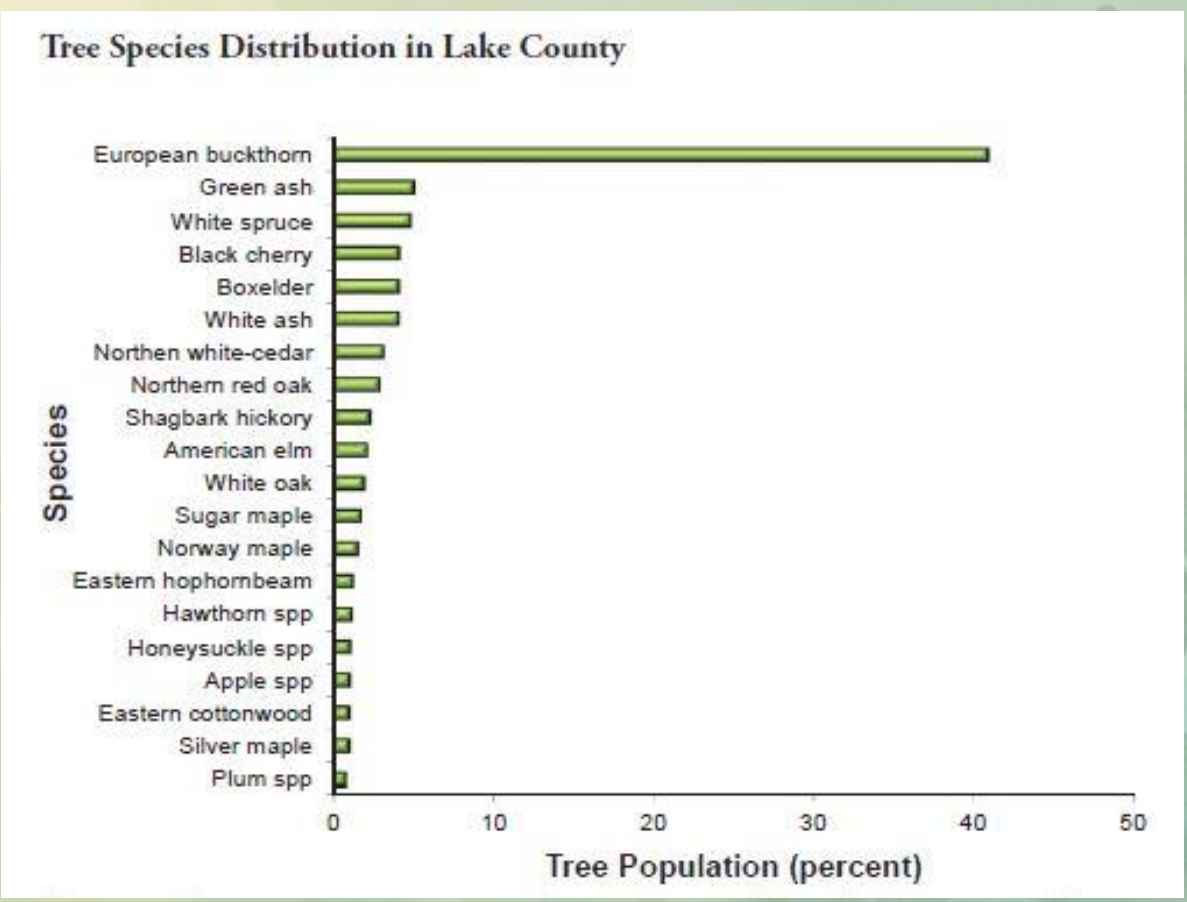
Table 9.—Percent of tree population by area and region for three most common tree species in each area, Chicago region, 2010

Area	Common Name	% of Population	
		Area[a]	Region[b]
City of Chicago	white ash	6.2	0.1
	mulberry	5.3	0.1
	green ash	4.9	0.1
DuPage County	European buckthorn	25.4	2.8
	boxelder	6.3	0.7
	black cherry	6.1	0.7
Kane County	European buckthorn	15.4	1.0
	boxelder	10.4	0.7
	willow	7.4	0.5
Kendall County	sugar maple	12.8	0.4
	mulberry	7.5	0.2
	American elm	6.2	0.2
Lake County	European buckthorn	40.9	8.7
	green ash	5.0	1.1
	white spruce	4.8	1.0
McHenry County	European buckthorn	35.7	5.1
	boxelder	7.0	1.0
	black cherry	6.0	0.9
Suburban Cook County	European buckthorn	31.1	8.6
	black cherry	6.0	1.6
	boxelder	5.3	1.5
Will County	European buckthorn	12.9	1.8
	sugar maple	12.7	1.8
	green ash	12.4	1.7

Urban Trees and Forests of the Chicago Region (2010)

Extent of the Impact

Lake County Totals:



Urban Trees and Forests of the Chicago Region (2010)

Middlefork Savanna

- High Quality
  - The Nature Conservancy
    - One of the two best remaining tallgrass savannas in the world
  - Dedicated Nature Preserve, 2002 + Buffer additions in 2011

- Chicago Wilderness
  - Most important sites for Biodiversity in NE Illinois
- Excellence in Ecological Restoration Program (CW)
- Platinum Accreditation, 2014

Middlefork Savanna

- Biodiversity
  - 400 Plant Species
    - 31 Rare Species
    - 6 State Endangered/Threatened Species
    - 1 Federally Endangered Species
  - 600 Animal Species
    - 6 State Endangered/Threatened Species
    - 29 Identified by the IDNR's Wildlife Action Plan (2006) as "species in greatest need of conservation"
    - 1 Federally Endangered Species

Middlefork Savanna

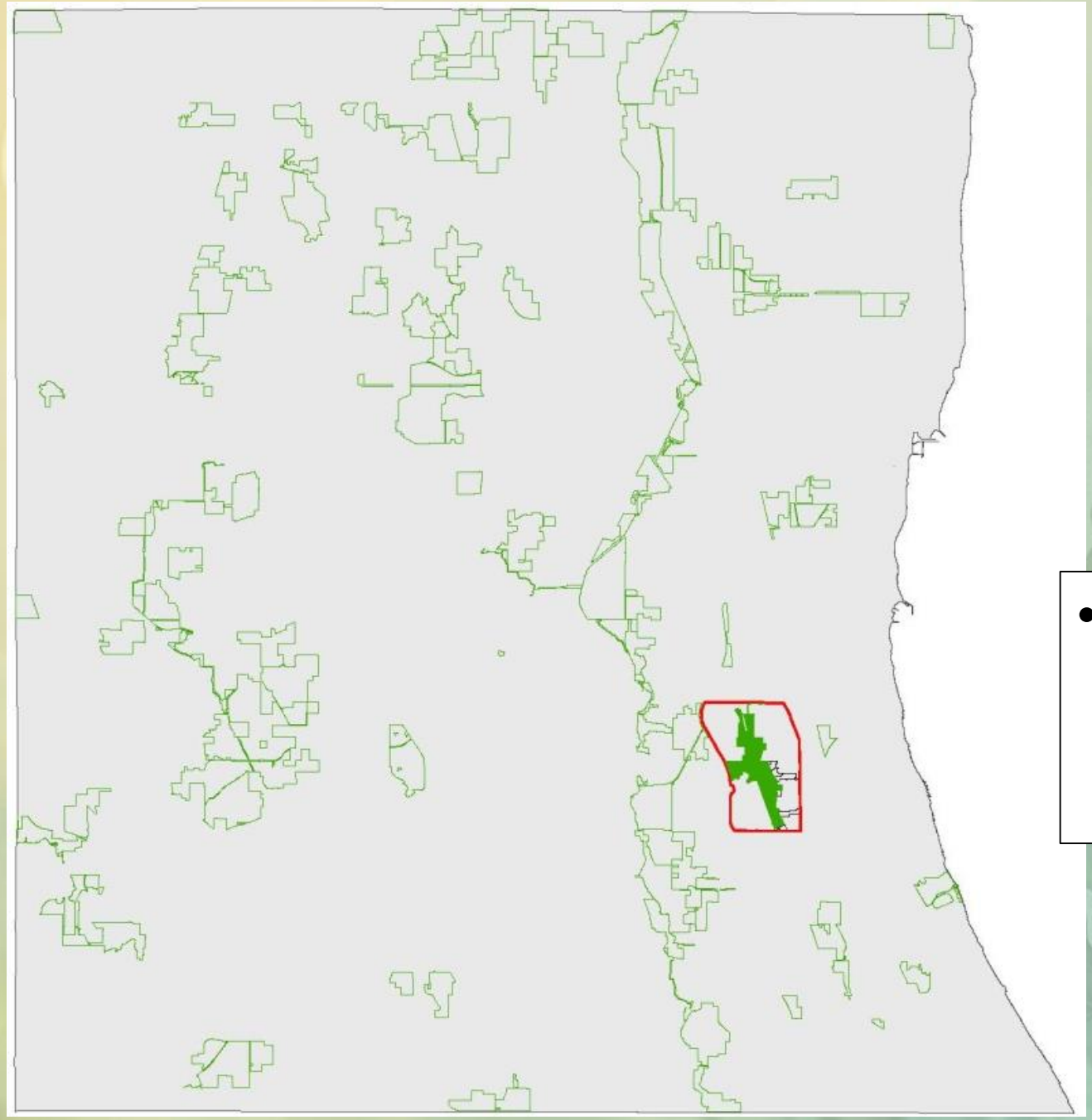
- Large Size
  - ~650 Acres
  - ~800 Acres of Protected Lands
    - City of Lake Forest
    - Lake Forest Open Lands Association
  - Landscape Scale Restoration
    - Large habitat blocks
    - Conservation Across Borders

Middlefork Savanna

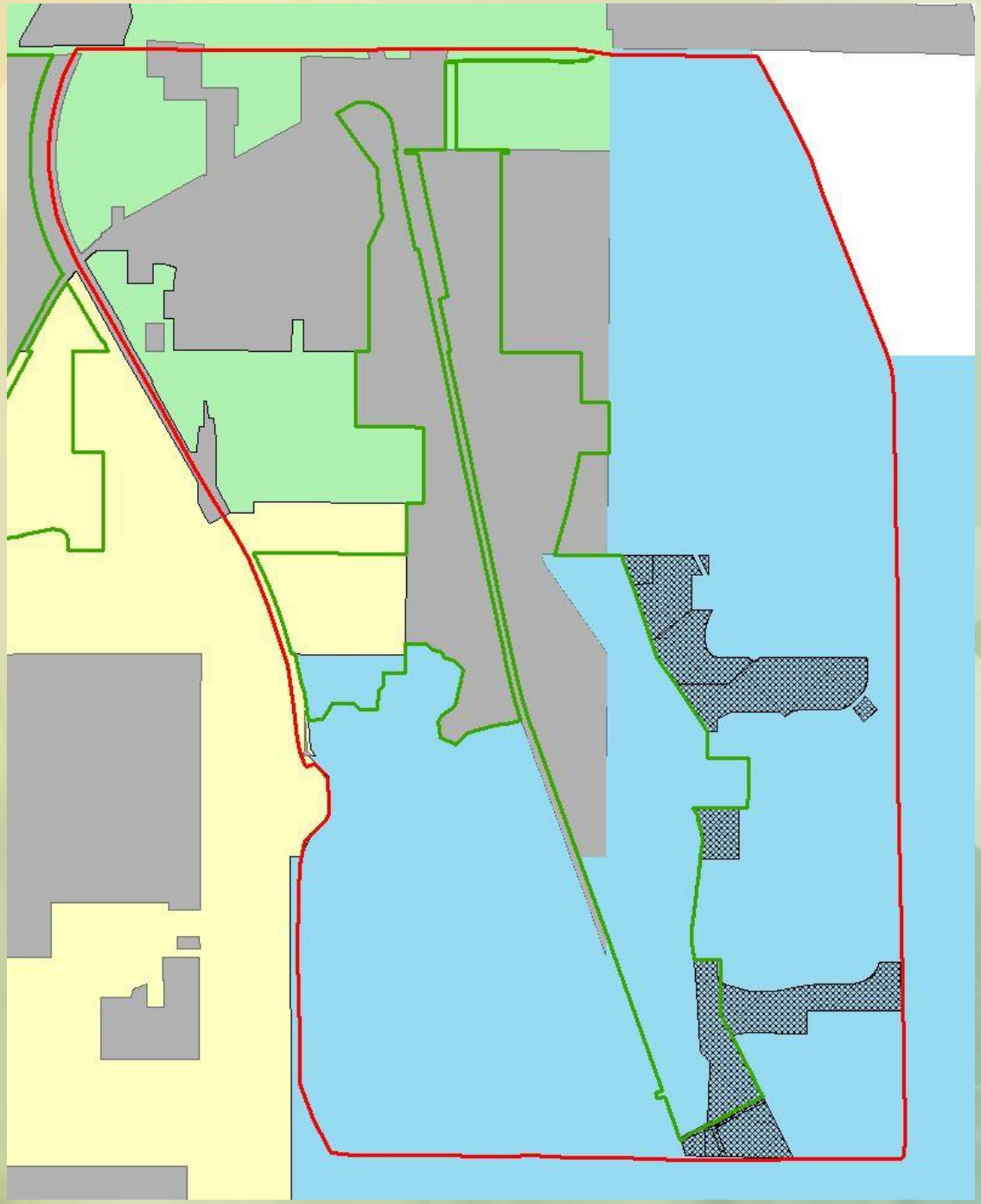
- Past Efforts
  - Restoration Priority Since Early 1990's
    - Exotic/Invasive Species Management
    - Restoring Natural Hydrology
    - Reintroduction of Fire
  - Extensive Plant and Animal Surveys/Monitoring Efforts
  - BioBlitz, 2008
- Currently all lands are being actively managed with the exception of a ~62 Acre parcel in the NW portion of the preserve

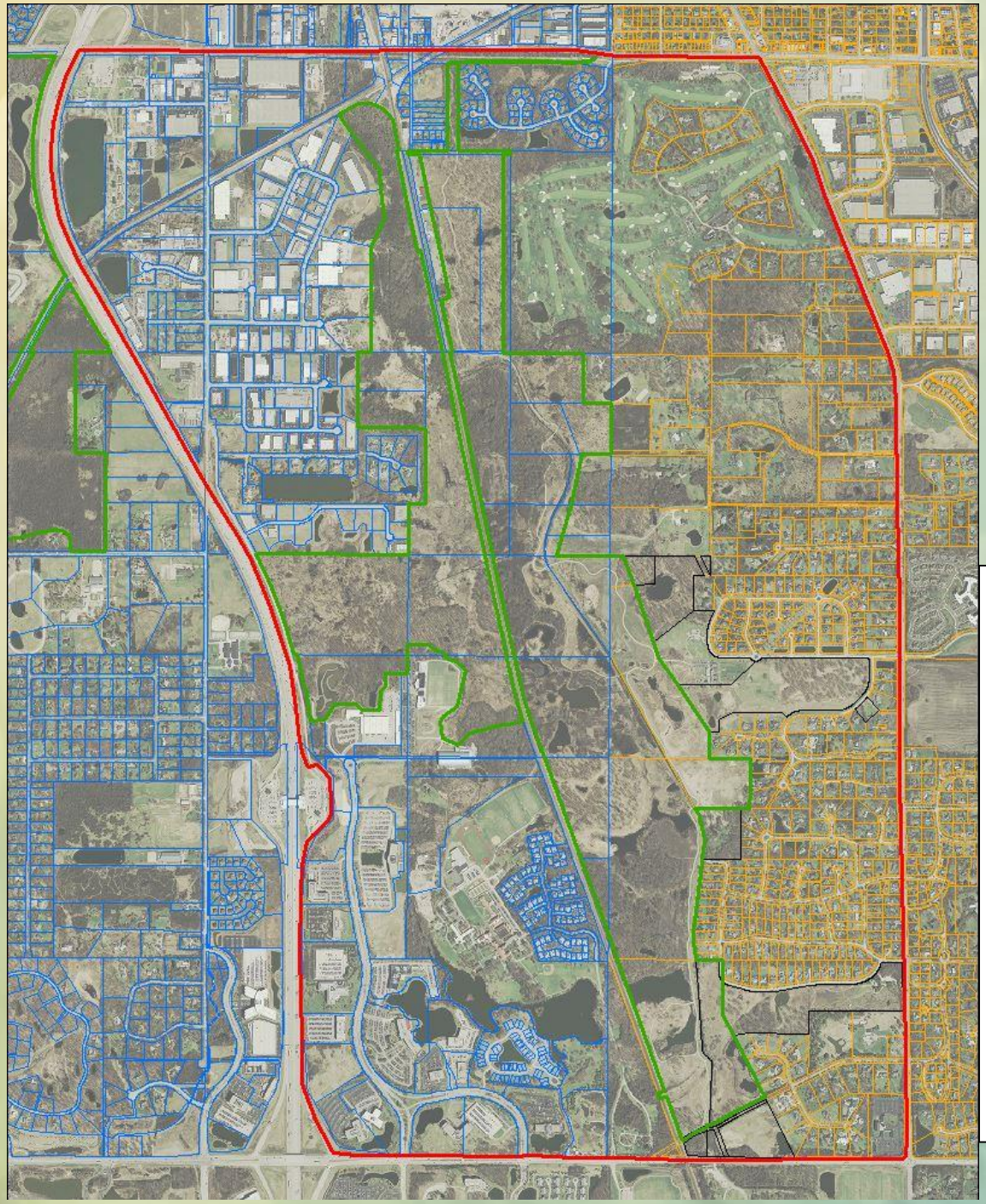
Buckthorn Eradication Plan

- Continual management = crucial
  - rare and significant plants and animals using the site, many of which require large habitat expanses.
- The invasion (re-invasion) of exotic species directly threatens these habitats and species
- This regionally important preserve, noted for its high quality and diverse plant and animal assemblages, along with its past management and restoration efforts, make this a unique area for a pilot buckthorn eradication project.

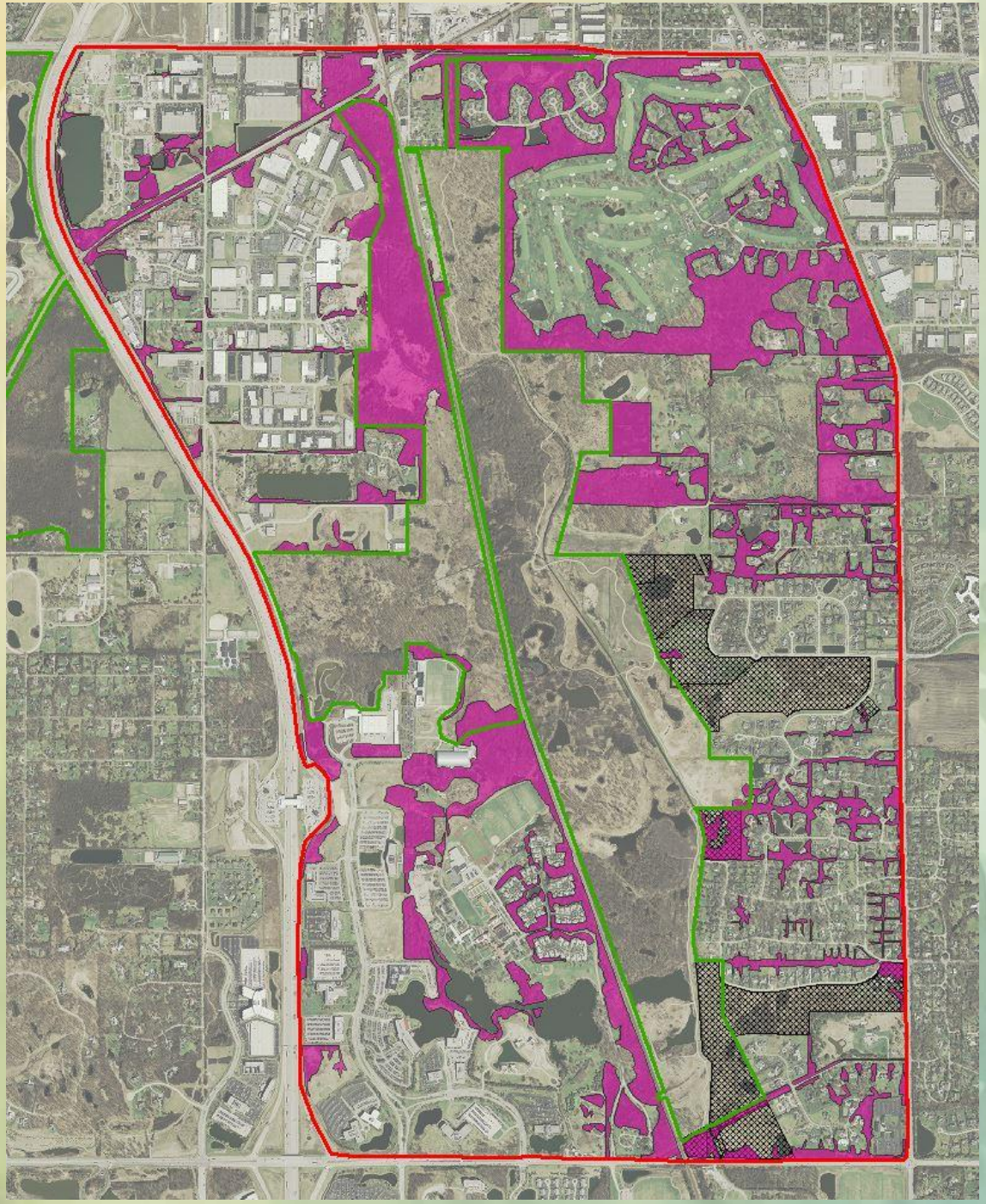


- Pilot Project Area
  - ~2900 Acres


Legend
Proposed Project Boundary
City of Lake Forest
Village of Green Oaks
Village of Mettawa
Unincorporated
Forest Preserve Boundary
Other Protected Open Space



- Pilot Project Area
  - ~700 Unique Property Owners
    - Residential
    - Light Industrial
    - Corporate Campuses
    - Schools
    - Transportation/ Utility Corridors



- Pilot Project Area
  - ~640 Acres Buckthorn

Buckthorn Eradication Plan

- First Steps
  - Methodologies for controlling buckthorn are well known to natural areas managers; however, strategies for connections with private landowners outside of preserve boundaries is not.
  - PARTNERSHIPS!!!
    - Morton Arboretum/Chicago Regional Tree Initiative
    - City of Lake Forest
    - Lake Forest Open Lands Association
    - U.S. Forest Service

Buckthorn Eradication Plan

Natural Resource Project vs. Outreach Campaign

- Communicating the issue
- Inspiring public involvement

Answer the Questions:

- What communication methods work? And why?
- What is effective in influencing/changing social norms?
- How can this strategy be replicated?

Buckthorn Eradication Plan

- Public Survey
  - Ability to Identify Buckthorn
  - Understanding/Awareness of Buckthorn Impacts
  - Perceived Benefits (Privacy/Noise Screen)
  - Needs
    - Technical – DIY; Landscape Contractor Specifications; Landscape Planning; Planting Alternatives
    - Financial – Removal; Replanting; Cost-share programs
  - Trusted Conservation Organization(s)

Buckthorn Eradication Plan

- **Honeysuckles (Lonicera spp.)**
- **Barberry (Berberis spp.)**
- **Burning Bush (Euonymus alata)**
- European High Bush Cranberry (Viburnum opulus)
- Olives (Eleagnus spp.)
- Privets (Ligustrum spp.)
- Multiflora Rose (Rosa multiflora)
- European Alder (Alnus glutinosa)
- Black Locust (Robinia pseudoacacia)
- Amur Maple (Acer ginnala)
- **Norway Maple (Acer platanoides)**
- Tree-of-Heaven (Ailanthus altissima)
- White Mulberry (Morus alba)
- **Callery Pear (Pyrus calleryana)**
- Siberian Elm (Ulmus pumila)
- Oriental Bittersweet (Celastrus orbiculatus)

Buckthorn Eradication Plan

Table 2.—Inventoried species listed on the Illinois invasive species list, Chicago region, 2010

Scientific Name	Common Name	% of Pop[a]	% of Leaf Area
Rhamnus cathartica	European buckthorn	28.2	6.55
Lonicera maackii	Amur honeysuckle	2.1	0.48
Robinia pseudoacacia	Black locust	1.9	1.93
Ulmus pumila	Siberian elm	1.4	3.24
Acer platanoides	Norway maple	1.2	3.57
Ailanthus altissima	Tree-of-heaven	1.2	0.70
Morus alba	White mulberry	1.0	0.84
Acer ginnala	Amur maple	0.5	0.16
Frangula alnus	Glossy buckthorn	0.3	0.09
Pyrus calleryana	Callery pear	0.2	0.14
Populus alba	White poplar	0.1	0.62
Maclura pomifera	Osage orange	0.1	0.11
Elaeagnus umbellata	Autumn olive	0.1	0.09
Euonymus alatus	Winged burningbush	0.1	0.01
Elaeagnus angustifolia	Russian olive	< 0.1	0.02
Corylus avellana	European filbert	< 0.1	< 0.01
Ligustrum vulgare	Common privet	< 0.1	< 0.01

[a] % of Pop - Percent of tree population

Buckthorn Eradication Plan

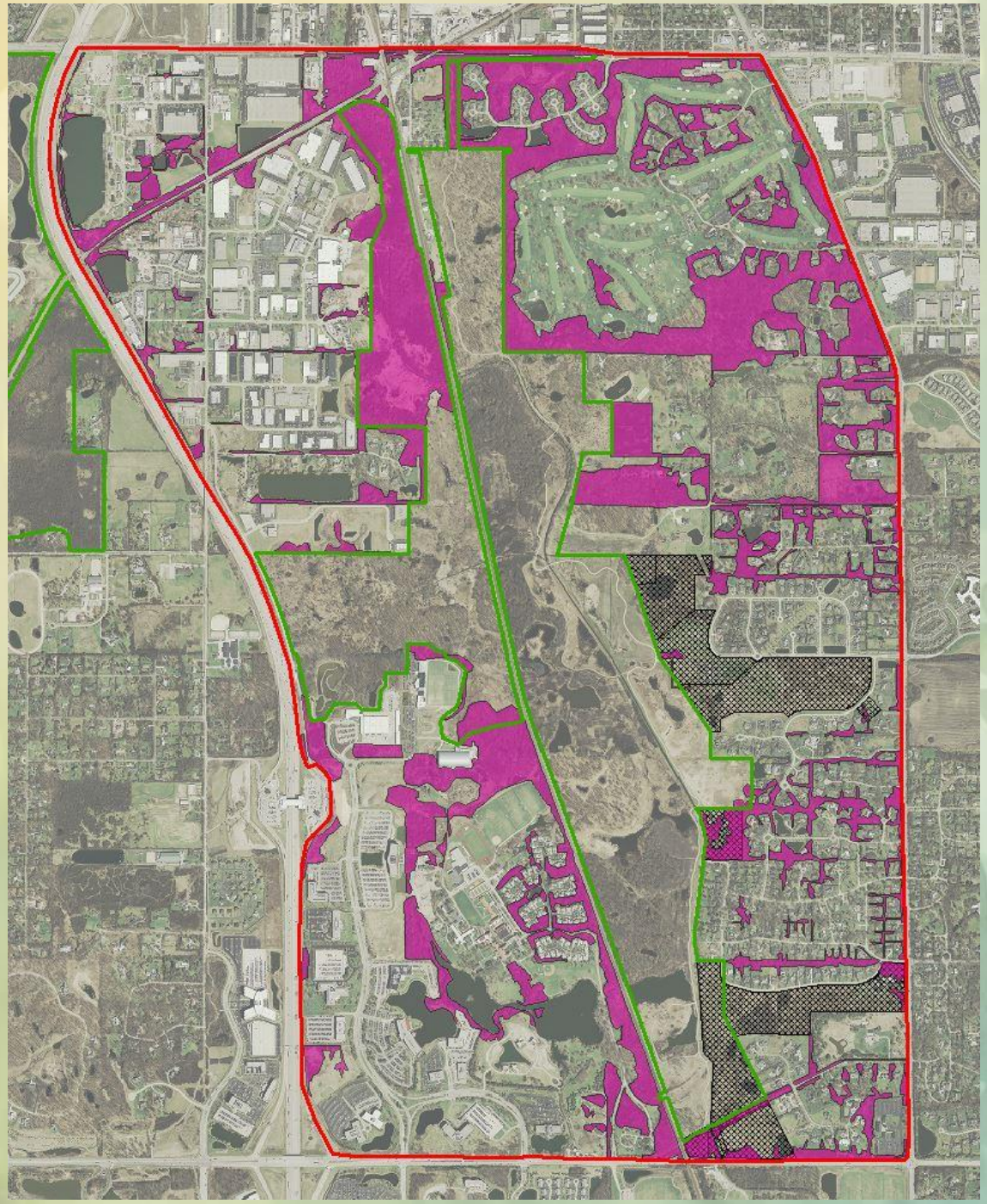
- Encourage replacement with:
  - Natives
  - Non-invasive ornamentals
  - Fencing

Black Haw *Viburnum prunifolium*

Scarlet Hawthorn *Crataegus coc*

Buckthorn Eradication Plan Phase I:

- Through a generous donation, the Forest Preserve will be addressing the remaining ~62 Acres of buckthorn within the preserve.

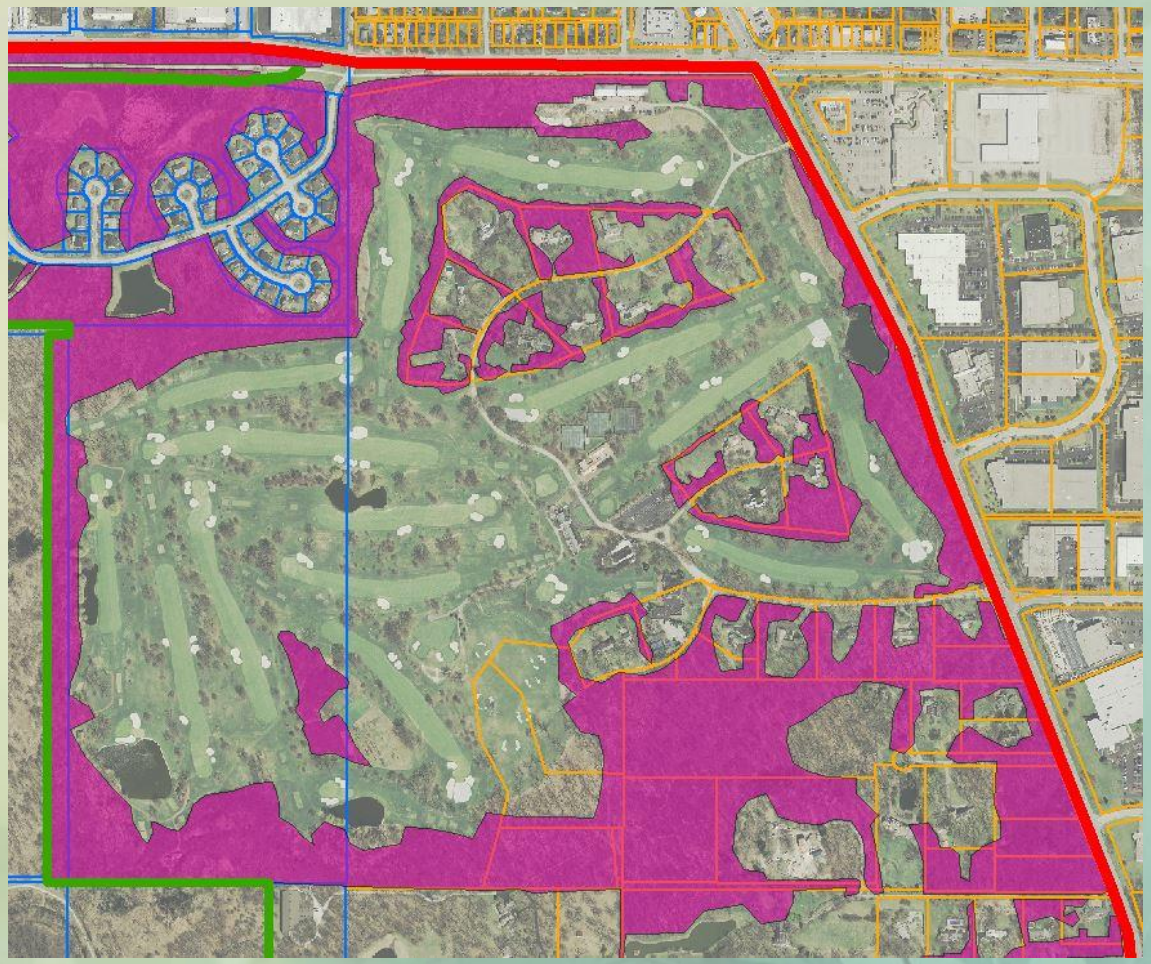


Grant opportunities =

leverage additional dollars/work from this donation to expand scope/reach

Buckthorn Eradication Plan Phase I:

- Knollwood Country Club



Buckthorn Eradication Plan Phase II:

- TBD
  - Survey Results
  - Communication Strategy
  - Events
    - Community Events
      - Demonstration Areas (Community Leaders)
      - Tours of Middlefork Savanna Forest Preserve and partner lands
      - Native Plant Sales
    - Presentations to Civic Groups
  - Specifications for Landscape Contractors
  - Web Page
    - Buckthorn removal/ecological restoration and native landscaping
    - Map “buckthorn-free” properties
  - Funding Opportunities

Buckthorn Eradication

Coming Soon
to a Landscape Near You

Questions

Matt Ueltzen
Lake County Forest Preserves
Restoration Ecologist
847-968-3290
mueltzen@LCFPD.org